PHOTO AND X-RAY PROCESSING ENVIRONMENTAL COMPETENCY

DEPARTMENT OF ECOLOGY
HAZARDOUS WASTE AND TOXICS REDUCTION PROGRAM
PUBLICATION 97-411

printed on recycled paper

The Department of Ecology is an equal opportunity agency. If you have special accommodation needs or require this document in an alternate format, please contact the Hazardous Waste and Toxics Reduction Program at (360) 407-6700 (voice) or (360) 407-6006 (TDD).

PHOTO & X-RAY PROCESSING
Environmental Competency
Ecology Publication #97-411

SECTION A: Environmental Management

A.1. Understand the Importance of Environmental Management in the Shop Setting.

A.1.1. Describe why it is important to properly manage all wastes.

Performance Objective 1: The student will be able to list some reasons why they must properly dispose of the wastes they create.

1) To be in compliance with the laws.
2) To avoid fines from regulatory agencies.
3) To protect themselves and others from injury and illness.
4) To avoid being liable for environmental cleanup.
5) To prevent pollution.
6) To be a responsible citizen.
7) To stay in business.

A.1.2. Know where hazardous waste regulations are found and what agency enforces them.

Performance Objective 1: The student will be able to cite the legal reference for hazardous waste management requirements.

LAW: Chapter 70.105 RCW, **Hazardous Waste Management Act of 1976**

REGULATION: Chapter 173-303 WAC, the **Dangerous Waste Regulations** (The regulation implements the law).

Performance Objective 2: The student will know which Agency enforces the regulations and provides technical assistance, and how to obtain a copy of the regulations.

The **Dangerous Waste Regulations** are enforced by the State Department of Ecology. They can provide you with a copy. Ecology provides assistance to keep businesses in compliance with the laws.

A.1.3. Understand the purpose of the "Waste Management Hierarchy".

Performance Objective 1: The student will understand what the Waste Management Hierarchy is.

- The Waste Management Hierarchy was set by the legislature to encourage reduction and recycling of wastes instead of disposal.
- The purpose is to provide environmental protection by preventing wastes from being generated rather than controlling the wastes after they have been created.
- Being "in compliance" with the laws means you are doing what is required. The goal of the hierarchy is to think "beyond compliance", to go the next step to eliminate, reduce, reuse, or recycle your waste.

Performance Objective 2: The student will understand the methods of handling waste in the preferred order, and provide an example of each.

Waste Reduction **- To not create a waste in the first place.**
- Not creating waste in the first place.
- Using chemicals until no longer useable.

Recycling **- Reclaim or reuse the waste.**
- Collecting used developer for pick-up by reclaimer.
- Recycling lead foil packets and film canisters.

Treatment **- To perform a process on the waste to eliminate its hazards or prepare it for disposal.**
- Evaporating cabinet washer water to reduce it's volume.
- Neutralizing acids or bases prior to disposal.

Incineration **- To thermally destroy a waste in an approved incinerator.**
- Sending hazardous waste to a facility to be thermally destroyed.

Landfill **- To put into an appropriate landfill.**
- Sending hazardous waste to a designated Hazardous Waste Landfill.

Performance Objective 3: Given waste streams typical of the shop, the student will be able to determine if it there is a more environmentally sound way to manage the waste.

Performance Objective 4: The student will be able to articulate why waste reduction is the highest priority.

Land disposal and incineration of wastes can be harmful to the environment and costly for the generator. By reducing the amount of waste produced, you can:

1) Protect the environment and human health
2) Save money
3) Reduce your financial liabilities
4) Avoid some regulations

A.1.4. Understand what is meant by the term "pollution prevention".

Performance Objective 1: The student will be able to articulate what "pollution prevention" means and provide general examples.

Pollution prevention is any method of reducing the amount of toxic materials used or released to the environment. It can be accomplished by:

- Replacing toxic materials with less toxic or non-toxic substitutes.
- Changing a process so a hazardous material is no longer needed.

A.1.5. Understand why pollution prevention is desirable.

Performance Objective 1: The student will be able to articulate how pollution prevention can benefit business, employees, and the environment.

- Reducing or replacing toxic materials reduces exposure to harmful substances, creating a healthier, safer workplace.
- By preventing wastes from being generated, you reduce hazardous waste management and disposal costs and liability.

A.2. Understand the basic waste management elements which are required by law for waste accumulation areas, containers, and labeling.

A.2.1. Describe the key requirements of waste accumulation areas.

Performance Objective 1: The student will be able to describe the key required elements of a waste accumulation area.

Waste accumulation areas must:

- Be well defined
- Be well marked with warning signs
- Have secondary containment

Performance Objective 2: The student will understand what secondary containment is and determine if it is sufficient in a given waste storage situation.

Secondary containment:

- Waste storage areas must have the ability to contain spills from tipped, overfilled, or ruptured containers.
- The containment must be able to hold 10 percent of the capacity of all stored containers or 110 percent capacity of the largest container, whichever is greatest.

A.2.2. Identify the basic waste container management requirements.

Performance Objective 1: The student will be able to identify the basic waste container management requirements.

1) Must be *suitable* for the waste
2) Must be in good *condition* and able to hold the waste
3) Must be kept *closed*
4) Must be *labeled* as hazardous waste
5) Must be *labeled* with the appropriate risk warning.

Performance Objective 2: The student will be able to determine if a container is appropriate for a given waste stream.

1) Suitability

Type of Waste:	Appropriate Container:
Waste Solvent	Metal container
Waste Corrosives	Plastic container
Waste Acids	Plastic container

2) Condition

Appropriate:	Not Appropriate:
Clean	Contaminated with other waste
Can hold the waste	Cannot hold waste due to: Sprung seams dents, holes, rust

Performance Objective 3: The student will be able to demonstrate how to close and label a container.

1) Keep Closed: Containers must be kept closed except when emptying or filling.

- The bung should be screwed in tightly.
- Ring lock, if present, should be closed securely to avoid leaks.
- Funnels should be removed except self-closing ones.

2) Labeled: Waste containers must be labeled with:

Information on label:	Example:
Dangerous waste	"DANGEROUS WASTE"
The type of waste described	"USED FIXER"
The hazards listed	"TOXIC"

A.3. Understand what the requirements are for spill prevention and cleanup.

Performance Objective 1: The student will be able to articulate the key elements of a spill response plan.

- Instructions on what to do when hazardous materials are spilled
- Who to contact
- The type of personal protection equipment needed
- The location of the spill cleanup supplies
- How to neutralize spills, if possible
- How to dispose of the wastes after cleanup
- How to prevent spills from occurring

Performance Objective 2: The student will be able to demonstrate what to do in case of a large spill of hazardous material.

- Locate and properly use spill response materials
- Contain the spill
- Contact the proper authorities
- Clean it up
- Manage the wastes properly

SECTION B: Photo & X-ray Processing Waste Management

B.1: Understand what wastes are generated from processing photographic film and paper, and that some of these wastes are hazardous. Understand the preferred management method for each waste and what the considerations are in deciding which method to use.

B.1.1. Identify the specific solid and hazardous wastes produced in photo processing and what environmental concern each poses.

Performance Objective 1: The student will be able to identify the most common solid and hazardous wastes generated during photo processing and what the environmental concern is with each waste.

Waste:	Environmental concern:
Hazardous wastes:	
Fixer, Bleach-fixer (blix)	High silver content; water quality concern.
Washless stabilizer	High silver content; water quality concern.
Potentially hazardous wastes:	
Systems cleaners	Can have high chromium or pH; water quality concern.
Developer	Non-hazardous waste, unless unused product with more than one percent (1%) hydroquinone is disposed.
Other wastes:	
C41 bleach	High silver content; water quality concern.
Wash water	Silver content; water quality concern; not usually a hazardous waste.
Plastic film containers	Recyclable; solid waste concern.
Scrap film and paper	Recyclable; solid waste concern.
Steel film magazines	Recyclable; solid waste concern.
Paper cores	Recyclable; solid waste concern.

B.1.2. Identify the preferred handling method for managing each type of waste.

Performance Objective 1: The student will be able to describe the preferred method of managing each type of photo processing waste listed above.

Hazardous Wastes:	**Preferred Management Method:**
Fixer and Bleach-Fixer	Manage as hazardous waste; send off-site for recovery or treat on-site with effective silver recovery equipment. Must meet state and local discharge limits before discharge to the sanitary sewer.
Washless stabilizer	Same as above.
Bleach	Same as above.
Potentially Hazardous:	**Preferred Management Method:**
Developer	Used developer can be disposed to sanitary sewer - - check with local sewer utility first. (Unused developer with more than 1% hydroquinone should be disposed of as hazardous waste.)
Systems cleaners	Determine if hazardous waste and dispose of as such.
Non - hazardous wastes:	
Plastic film containers	Recycle through film manufacturers program or give to customers to reuse.
Scrap film	Recycle.
Steel film magazines	Recycle through film manufacturers program.
Paper cores	Recycle through film manufacturers program.
Wash waters	Only dispose of wash water to sanitary sewer if silver levels are below state and local discharge limits.
Bleach	Same as above. (Exception: don't put into electrolytic unit).

B.1.3. Identify the regulatory requirements and other key considerations involved in deciding how to best manage silver bearing wastes.

Performance Objective 1: The student will be able to identify which authorities have jurisdiction over silver discharge limits, what those limits are, and how to determine which limits are applicable.

Authority:	Silver Discharge Limit:	Applicable area:
Washington State Department of Ecology	5 parts per million (ppm)	Statewide
Local Sewer Authority	Ranges from 0.1 - 3.0 ppm	Within local sewer district

Performance Objective 2: The student will be able to describe the most common off-site and on-site options for managing silver bearing wastes and how they are used.

Off-site options:	How to use:
Hazardous waste disposal facility	Find in phone book, self-haul waste to facility
Hazardous waste disposal service	Find in phone book, order pick-up service.
Local hazardous waste collection event	Call county environmental services for information and eligibility, self-haul waste to the event.

On-site options:	How to use:
Common silver recovery equipment	
Chemical recovery canisters (CRC)	Always use two CRCs in a series, with regular maintenance, testing and changeover logs. Don't put developer in CRCs, it can plug them.
Electrolytic units	Always use in conjunction with two CRCs in series. pH of solutions usually needs to be adjusted. Don't put bleach in electrolytic units.

Other silver recovery technologies:
Chemical precipitation
Ion exchange
Reverse Osmosis
Evaporation/Distillation

Performance Objective 3: The student will be able to identify the key considerations in deciding whether to use off-site or on-site management methods for silver bearing wastes.

Key considerations:

1) Determine if local sewer authority silver discharge limits apply, and if these limits can be met with on-site equipment.
2) The trade off between using on-site versus off-site recovery for silver:
    - On-site silver recovery systems require routine maintenance and testing.
    - The cost of on-site versus off-site management for the volume of waste generated.
    - Space for on-site equipment may be limited.

Environmental Competencies
- - - Evaluation - - -

Dear Vocational Instructor: *In order to improve our services, the* ***Department of Ecology*** *asks you to please complete this evaluation on the environmental competencies you have used. We will use your comments for future revisions. THANK YOU !*

This evalution is for the environmental competency in (Circle):
AUTO REPAIR AUTO BODY DENTAL PHOTO
WOODWORKING

Ranking: Level of satisfaction / agreement: **1 = Low 5 = Average 10 = High**

1). The information in this competency is appropriate for the students.
1 2 3 4 5 6 7 8 9 10

2). The level of detail was sufficient for me to teach it.
1 2 3 4 5 6 7 8 9 10

3). The supplemental materials answered most of my questions.
1 2 3 4 5 6 7 8 9 10

4). It was easy to incorporate the competency into the curriculum.
1 2 3 4 5 6 7 8 9 10

5). The layout was clear and easy to use.
1 2 3 4 5 6 7 8 9 10

6). It is important for students to learn about environmental management.
1 2 3 4 5 6 7 8 9 10

7). "I have incorporated this information into my curriculum."
1 2 3 4 5 6 7 8 9 10

8). Additional comments, or suggestions:_____

_____

_____

9). Requests for additional info:_____

_____

_____

10). Name & Program:_____
School:_____

Send to: Patricia Jatczak, Dept. of Ecology, P.O. Box 47600, Olympia, WA 98504-7600 Or FAX: (360) 407-6715